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ABSTRACT

Proper planning in the design of new school facilities saves time, money, and resources. The importance of planning increases when funds are scarce, as limited dollars must be put to their best use. A dialogue should be generated in the community and among members of the school planning committee regarding how schools should look. Many questions that must be considered in the construction of new schools and building remodeling are addressed as well as issues and alternatives each district can take into account with its own resources, situation, and philosophy. The first section looks at a hypothetical school containing design elements that are described and discussed in section 2. Section 3 outlines planning steps, specification determination, and planning for quality. Design examples of nine schools, a master plan checklist, and a listing of resources in providing planning assistance are included. (EJS)

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Schools for the Twenty-first Century

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California Department of Education

Bill Honig—State Superintendent of Public Instruction

Sacramento, 1990

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Schools for the Twenty-first Century

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Foreword

OUR educational reform movement in California has embarked on an ambitious undertaking. We are attempting to educate more of our students to higher levels of academic achievement than ever before. Students need this education if they are to compete in the increasingly technological job market and if they are to acquire the civic and ethical values necessary to keep our nation strong.

Our task is made doubly difficult because our student population is exploding—over 200,000 new students enter our schools annually. Furthermore, this population is becoming increasingly diverse and, unfortunately, too many of our students come to school with social and health problems.

A strengthened academic program for all students does not exist in a vacuum. It depends on school buildings that enhance rather than impede the delivery of our educational programs. In some cases, the buildings already exist; they need only to be adapted to the requirements of students in the twenty-first century. In other cases, additional facilities will have to be constructed for the new students. In either case, many of our school facilities of today will be inadequate for our schools of the future. Therefore, any planning for school facilities must be based on a vision of change.

This document, *Schools for the Twenty-first Century,* addresses some of the questions that must be asked in districts that are considering constructing new schools or remodeling existing

buildings. This publication does not prescribe rules or set guidelines. Its purpose, rather, is to generate a dialogue in the community and among members of school planning committees regarding how their schools should look. It raises various issues and provides alternatives that each district can consider, taking into account its resources, situation, and philosophy. The planning process should be based on a vision of what the current and future uses and users of the facilities will be. Curricular requirements and the needs of students, staff, and the community all play a part in this changing picture.

Schools for the Twenty-first Century begins with a look at a hypothetical school that includes many of the design elements that are then described and discussed in the second section of the document. The third section outlines the steps that districts can take to begin the planning process. This process should involve representatives from each sector of the school and community who will be using the facilities—students, teachers, parents, staff, administrators, support staff, and community members—because each will offer an important perspective.

Planning wisely does not cost any more than failing to do so, and many of the ideas in this document are not costly. In other cases, spending more initially on some design components will pay off over the years. In the long run, proper planning will save money, time, and resources because the facility will perform at its maximum efficiency and capability for many years. Nor do funding shortages eliminate the need for good planning. In fact, the importance of proper planning increases when state and local funds are scarce, because these limited dollars must be put to their best use.

If we consider how rapidly technology has changed our schools and workplaces in just the past decade, we realize that we need to approach the future with great creativity and imagination. For instance, soon ditto machines and typewriters will be gone from our offices altogether. Equipment such as fax machines, copy machines, and computers are already virtually everywhere. School planning needs to keep up with these and other changes—some of which may be difficult to envision today. I hope that this document will assist you in that process.

Bill Honig

State Superintendent of Public Instruction

I. Bayview Elementary—A School for the Twenty-first Century

BAYVIEW is a hypothetical elementary school of the near future. It doesn't look very different from an elementary school of today. However, if we follow a typical student through a day at Bayview, we see that the school was designed to function hand in hand with the technology and the educational philosophy of the twenty-first century.

"Hurry up!" Quentin says to his four-year-old sister, Anna. "Why are you so slow?"

"I'm trying," Anna answers, starting to hang up her jacket.

Quentin and Anna Ortiz have just been dropped off by their mother at Bayview Elementary School. After Ms. Ortiz signs in Anna, ten-year-old Quentin helps Anna put her belongings away at her day-care program in the school's early primary center.

Bayview, which has recently been remodeled, is a four-track, year-round school. It can accommodate about 720 students, and approximately 600 attend at any one time. Located in a busy urban area next to a community college, the school and the college share land and other resources.

This morning the assistant principal, Ms. Fong, stands outside to greet the students who attend the before-school

program. The school's main office faces the street so that the office staff can watch everyone entering and leaving the school. The school is designed so that access is limited at other points.

"Good morning," Ms. Fong says as she comes into the room, smiling at Quentin's impatience. "Quentin, what's your hurry?"

Quentin looks embarrassed and answers, "Good morning, Ms. Fong. I'm late. I have to meet Jake and Lisa. We're going to work on our science project before school starts."

"Well, go on then," replies Ms. Fong. "I'll help Anna."

Ms. Fong takes Anna into the bright and cheerful day-care center. Several children are already there. Some are sleepy and sit on a big couch listening to a story being read; others are busy at the many activity stations. Anna runs to join the students who are starting to eat breakfast in the center's kitchen, which is separate from the cafeteria for the school-age children.

Bayview's early primary center is for children from four through six years of age. The school's primary center serves children from seven through nine years of age, and its intermediate center is for children ages ten through twelve years. Classrooms and conference rooms for the primary and intermediate students are adjacent to each center's activity room. The classrooms vary in size. The activity rooms are filled with books, video players, videotapes, games, computers, and other resources. The school's day-care programs, held before and after school and during vacations, are housed in these activity rooms.

After leaving Anna with Ms. Fong, Quentin finds Jake and Lisa in the intermediate center with their teaching assistant, Mr. Leon, a community college student. They have agreed to meet before regular class begins to work on their group project, one of several they are required to do each year. The four of them go into a conference room to discuss their project.

Quentin and his friends are learning about the life cycle of amphibians. They discovered the *axolotl* on a field trip to the local science center and became interested in this species of tiger salamander from Mexico, which is unique because it never develops into an adult salamander. All three students want to learn more about this strange creature, so they decided to build an aquarium for two axolotls and produce a videotape about them. The science center's director said that if the female had babies soon, Quentin's group could have two.

"Jake, did you find out whether the axolotls need fresh or salt water?" Quentin asks.

"No," Jake replies, "I need to do that now. I am pretty sure that they are supposed to be in a saltwater tank. But I'll hook up with the college reference center on the computer and see what I can find." Working at his computer, Jake has a direct electronic line to the college next door, which greatly expands his ability to gather information.

Athough their work on the axolotl is a science project, Quentin and his friends will also be learning mathematics,

history–social science, and English–language arts during their project. At Bayview, the teachers work together to teach an integrated curriculum. Through projects such as this one, students' time in the classroom becomes more flexible.

Later that day Quentin goes to his humanities class, and he sees that none of his regular teachers is there.

"Where are all the teachers?" he asks Ms. Perkins, one of the teaching assistants.

"They are all in the staff-development center," she replies. "They are attending a teleconference that shows them how to integrate art, history, and literature. Sounds good, doesn't it? Mr. Taylor, the student teacher, and a substitute will be supervising your class."

Quentin shrugs. "How come they need to learn that now? I thought they went to college to learn how to do that."

"They learn a lot in college, but learning doesn't stop when you leave school," Ms. Perkins answers.

"I guess not," Quentin agrees. "My mom is always taking classes. What are we going to do today?"

"We're going to continue our group work on the events that led to the Revolutionary War. Weren't you researching the Stamp Act of 1765?" Ms. Perkins asks. "You don't have to wait until all of your group gets here. Go ahead and get started on the computer."

Quentin replies, "I made our group a special computer file so that we can track how far we have gone. I'm going to start to search for bibliographies."

Quentin's humanities class is held in a large room that is surrounded by several smaller rooms. The entire class usually meets at the beginning of a unit or project, and then it breaks into smaller groups that work alone or with other groups. The large room has a teacher's workstation, which accommodates reference books, telephones, a computer, a laser disk player, and a closed-captioned television. The teacher's computer is connected to several other computers in the room and to a larger resource center at the county library and the community college.

The smaller rooms are used for small-group discussions, individualized study, tutoring, and conferences. In addition to their workstations in the classrooms, each of the teachers has access to office space with a private telephone and a computer that stores students' records, lesson plans, and resource materials. The office includes a photocopier, a laminator, and a facsimile machine for the staff to use.

The teachers and teaching assistants spend a great deal of time moving around the rooms, guiding the students, asking them about their activities, observing their progress, taking notes, and videotaping results. Most of the testing of the students consists of having them perform tasks and then evaluating their performances.

Bayview's original administrative office has been converted into rooms that are used by other community agencies. Many of the other buildings at the school are now relocatable and can be added or taken away as the number of students in-

creases or decreases. These buildings differ greatly from the portable classrooms of the past. They are all attractive and look permanent. The rooms are used by medical and dental personnel, social workers, community health workers, and other service workers who need to meet with students and their parents or guardians.

Although Quentin's school has been remodeled, it is not finished. The facilities planning group for the school was unable to design an area for physical education that fit within the old school grounds and met the school district's budget. Quentin's mother, who is a physical education instructor at a nearby school, participated on the planning committee. Her subcommittee continues to meet to determine how it can construct appropriate indoor and outdoor physical education facilities. In the meantime, the school shares grounds and facilities with a nearby community park and the community college.

The school is also a community meeting place for many of the families of Bayview's students who are new to the United States and do not speak English or understand all the customs. They can take adult education classes at the school and also take advantage of the many services provided by other community agencies. In addition, the school has an outreach worker who schedules visits for them with community agencies.

Thus, we can see that, although Bayview looks very much like a school of today, its focus is much broader. Our hypothetical school of the twenty-first century is a full-time, year-round community resource. It meets not only its students' educational needs but also the needs of their families and the community in which they live. For Quentin, Anna, and their family, "going to school" has taken on a whole new meaning.

II. Designing Schools for the Twenty-first Century

THE success of a school like Bayview depends on many things. One of these is the design of the school itself. A good academic program can be enhanced—or hindered—by the facility in which it is carried out. Thus, committees planning the remodeling of existing schools or the construction of new schools should carefully consider the effects of the schools' programs on the designs of the schools, and vice versa. The following examples, taken from the programs and design of the hypothetical Bayview Elementary, are intended to help members of planning committees see the correlation between a school's programs and its buildings and to help them envision a design that goes beyond that of the traditional schoolhouse. Figures 1 through 10 in this section are plans that have been used for existing schools; they further illustrate the relationship between the design of a school and the programs and people that school serves.

Varied Methods of Instruction

"The entire class usually meets at the beginning of a unit or project, and then it breaks into smaller groups that work alone or with other groups."

At Bayview, teachers tailor their methods of instruction to the needs of students. They teach large groups, small groups, and

Figure 1. Blackstock Junior High School

Port Hueneme, California

The design of this classroom facilitates the use of several methods of instruction. For individual, small-group, and cooperative instruction, five work areas around the perimeter of the room can each accommodate six students at computer terminals. For large-group instruction, the teacher has access to computer terminals and can project work, via a ceiling-mounted projector, on to the large projection screen. This design incorporates the use of a variety of electronic technology adaptable to teaching, including laser disks, CD-ROM (compact disks with read-only memory), and videotapes.

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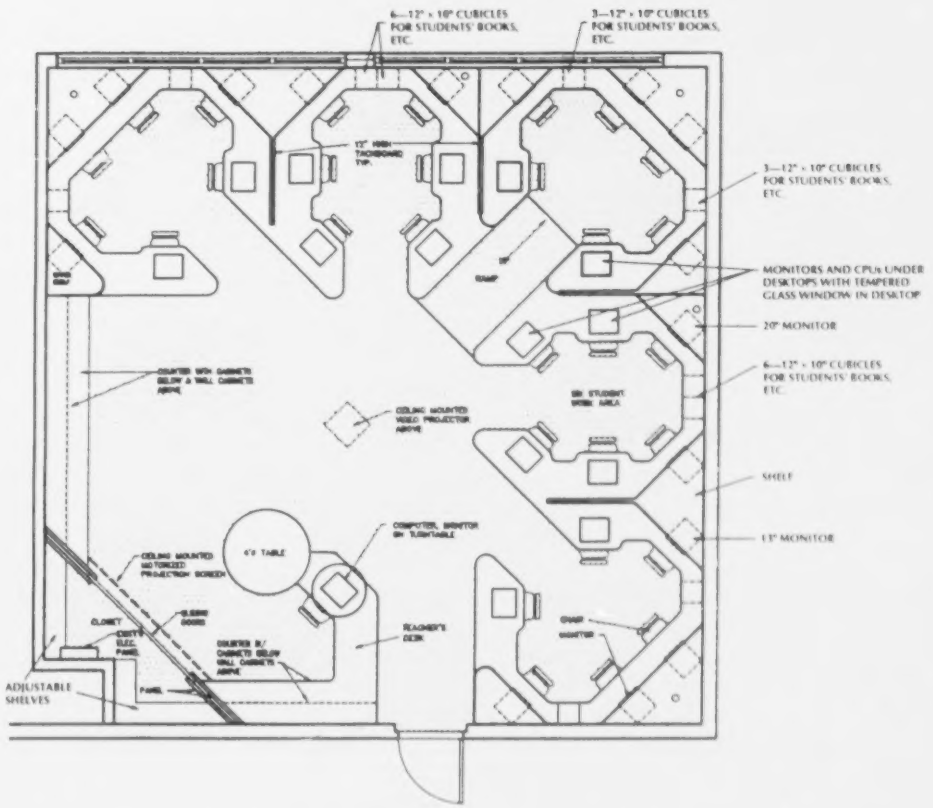

6—12" x 10" CUBICLES FOR STUDENTS' BOOKS, ETC.
3—12" x 10" CUBICLES FOR STUDENTS' BOOKS, ETC.
3—12" x 10" CUBICLES FOR STUDENTS' BOOKS, ETC.
MONITORS AND CPUs UNDER DESKTOPS WITH TEMPERED GLASS WINDOW IN DESKTOP
20" MONITOR
6—12" x 10" CUBICLES FOR STUDENTS' BOOKS, ETC.
SHELF
13" MONITOR
CEILING MOUNTED VIDEO PROJECTOR ABOVE
6'0 TABLE
ADJUSTABLE SHELVES

individuals. In traditional classrooms, it is difficult for several groups of students to work simultaneously because there is too little space and too much noise. Usually, the teacher is the only adult in the room. In the future, it may be much more common for two teachers to teach as a team or for several assistants or parent volunteers to work along with the classroom teachers.

Instructing in a variety of ways accommodates the diverse needs of students. Students learn in different ways and at different speeds. The more the teacher can match his or her method of instruction to each student's learning style, the more likely it is that the student will grasp what is being taught. Some students are visual learners and respond to print, pictures, signs, and movies. Others are auditory learners and respond to the spoken words of the teacher and other students and to tape recordings. Some students learn kinesthetically by acting out what they are learning or by constructing models or projects that illustrate their problems visually.

Effective teachers meet these diverse needs by using different classroom groupings. They may instruct the whole class; divide the class into cooperative learning groups; individualize instruction; use teacher-directed lessons; or introduce enrichment activities.

Design Implications

Flexible classroom spaces are necessary to accommodate various-sized groups and multiple instructional methods. Will flexibility be provided by:

- Building classrooms of various sizes?
- Providing small-group spaces adjacent to standard-sized classrooms?
- Arranging classrooms in clusters with walls that can be removed to create large-group spaces?
- Providing spaces where students may work alone?
- Providing areas adjacent to classrooms where teachers can prepare for classes; where teaching teams can meet; and where conferences of teachers, students, and parents can be held?

To accommodate the individual learning styles of students, will facilities:

- Provide various *habitats* (learning centers, lofts, project spaces, common gathering areas, individual workstations or carrels)?
- Accommodate various learning resources?
- Be scaled to diverse users?
- Be accessible to users on demand?

Certain specialized courses require classrooms equipped with special furniture and equipment.

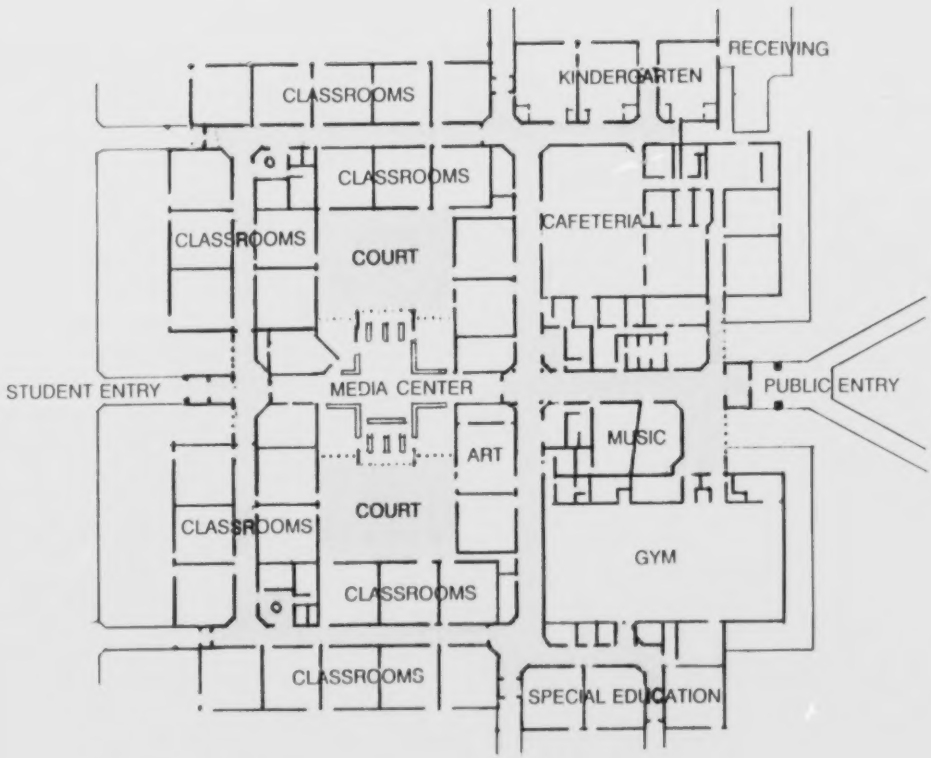
- Which equipment will be built-in, and which will be movable?
- Will the room accommodate new technology?
- Will space be provided for computer terminals for the teacher to store students' records?
- Will equipment space for individuals with exceptional needs be provided?
- Will rooms be equipped for large-screen projection and interactive computer networking?

Because students' interaction with people and materials is an integral part of education, control of sound in the physical environment is important.

Figure 2. Edinbrook Elementary School
Brooklyn Park, Minnesota

Edinbrook's design is one that is receiving increasing acceptance for its ability to integrate new technologies and traditional functions. At the center of the school are its support facilities—the media center, administrative offices, cafeteria, and space for other support activities. These centrally located services are easily accessible from the surrounding classrooms.

Armstrong Torseth Skold and Rydeen, Architects



- Will noise be controlled through the acoustical treatment of walls, ceilings, and floors?
- Will noise be controlled by soundproof, movable walls where open-space classrooms are used?
- Flexibility and adequacy of power sources are important.
- How will the number and location of electrical outlets be determined?
- Will the location of power sources allow flexibility in the arrangement of furniture?
- Will adequate electrical wiring be provided for the possible addition of new technological equipment?

Use of Manipulative Materials

"All three students want to learn more about this strange creature, so they decided to build an aquarium for two axolotls and produce a videotape about them."

Traditional classrooms, other than kindergarten rooms, have not had a variety of materials for students to use, such as animal environments; gardens; video players; libraries; simple machines; colored number rods; geoboards; cooking materials; accessible art materials; and objects for classifying, sorting, and ordering. Ideally, future classrooms will have many kinds of materials that match the developmental ages of the students.

Students also need hands-on experiences with tangible materials to help them understand abstract concepts. They need many opportunities to read, write, talk, listen, solve problems, experiment, explore, and construct meaning out of what they are learning. Many books and films or videos should be available to students, and they should be given time to discuss and write about what they have studied. For example, the students need to learn science by sorting and classifying objects and conducting experiments to find out why and how things act the way they do. Students can solve mathematical problems by using materials they can manipulate. They need to explore both the visual arts and the performing arts of dance, theater, and music.

When encountering new concepts or problems, most people over the age of eleven years can function at the abstract level and solve problems in their heads. However, almost everyone, including adults, can benefit from using tangible materials to solve a difficult problem or to understand a new concept.

Design Implications

As students work with more materials, additional space will be necessary.

- Will additional storage space be provided for materials when they are not being used? Will storage space be accessible to students to facilitate cleanup?
- Will this space be custom-built for the specific items?
- Will work surfaces be large, smooth, easy to clean, and at students' heights?
- Will the classroom be large enough for students to work with materials?

Collegiality and Professionalism Among Teachers

"At Bayview, the teachers work together to teach an integrated curriculum."

Traditionally, teachers have worked alone, isolated in classrooms with their students. In the future, several adults—teachers, paraprofessionals, teachers' assistants, and volunteers—will work with groups of students.

Teachers are now being encouraged to work together to plan curriculum and instruction and to solve problems. To do this, they need access to current educational research and other information which has usually been available only at a central district library. They also need access to office space and conference areas to study and plan together or alone.

Design Implications

Teachers need space to work together. Classrooms need to be larger if several adults will be working with the students.

- Will a professional library be available to teachers in the school, as well as space in the classroom for their own professional books? Will they have electronic access to other information centers?
- Will work space and offices, with telephones, be provided for teachers in or near classrooms?
- Will meeting rooms be provided near classrooms for professional development and for parent-teacher or teacher-student conferences?
- Will there be easy access to supplies and equipment; i.e., computers, electronic data transfer networks, video and laser disk equipment, teleconferencing equipment, facsimile machines, duplicators, and laminators?
- Will technology be used to minimize teachers' administrative workloads and to provide more and better in-service training?

Services for Children at Risk of Failure

"The rooms are used by medical and dental personnel, social workers, community health workers, and other service workers who need to meet with students and their parents or guardians."

Traditionally, schools have focused on students' educational needs. In today's world, the definition of the family is different from what it used to be. Many families live below the poverty level—some are even homeless. Schools are the logical places to coordinate services that meet children's social, physical, mental, and emotional needs. It is almost impossible to educate a child who has not eaten properly in weeks, is being abused or neglected, or is sick and cannot afford medical treatment.

There is a growing consensus that schools, families, communities, and the private sector must become stronger partners in helping all children, particularly children at risk of failure, to reach their full potential. While schools can become organized better to serve youth at risk of failure, they cannot serve these youth alone. Early intervention and prevention services are necessary, as well as a reorientation of existing services.

Furthermore, many California children are not physically fit. Too many students have unwanted pregnancies; use drugs, alcohol, and tobacco; and suffer from sexually transmitted diseases, eating

disorders, and stress-related conditions. In the future, campus health clinics may serve children who do not otherwise have access to medical services, or health professionals may visit the schools regularly to examine and treat students. There must be more cooperation between the schools and the agencies that work with families, such as social services, welfare, juvenile justice, and health services agencies.

School kitchens may also be used to prepare food that will be taken to community groups, elderly citizens, low-income families, and the homeless. The athletic facilities may be more comprehensive to encourage physical fitness among the students, staff, and community. The school will house adult education classes for individuals seeking to expand their knowledge, learn or upgrade job skills, satisfy citizenship requirements, and study other cultures. The school will be an integral part of the entire community and will meet a variety of needs beyond the education of its students.

Design Implications

Partnerships between the school and the community may change the design of schools.

- Will offices and meeting spaces be provided to enhance communication and foster a close working relationship among the various people and agencies providing services in education, social welfare, mental health, juvenile justice, and youth employment?
- Will these spaces vary from small offices and conference rooms to large meeting rooms where representatives from the schools, family, community, and private sector can meet with students and with each other?
- Will provision be made for electronic interaction between the school and other agencies?

The students' social and emotional well-being must be considered in the design of a facility.

- Will video cameras monitor secluded, unsupervised areas? Will there be unimpaired views of areas of open space? How will security be ensured and forbidding structures avoided?
- Will alarm systems, distinct from the passing bells, be installed to alert students to emergencies on campus?
- Will there be a closed-campus policy? How will access be restricted? Will the design of buildings provide barriers, or will fences be used?
- Will multipurpose rooms be planned with stage facilities for performing arts events; will these areas be usable for dances and large meetings?
- Will various small-group areas with homelike atmospheres be provided for studying, counseling, and psychological evaluation?

The physical well-being of students also needs to be considered.

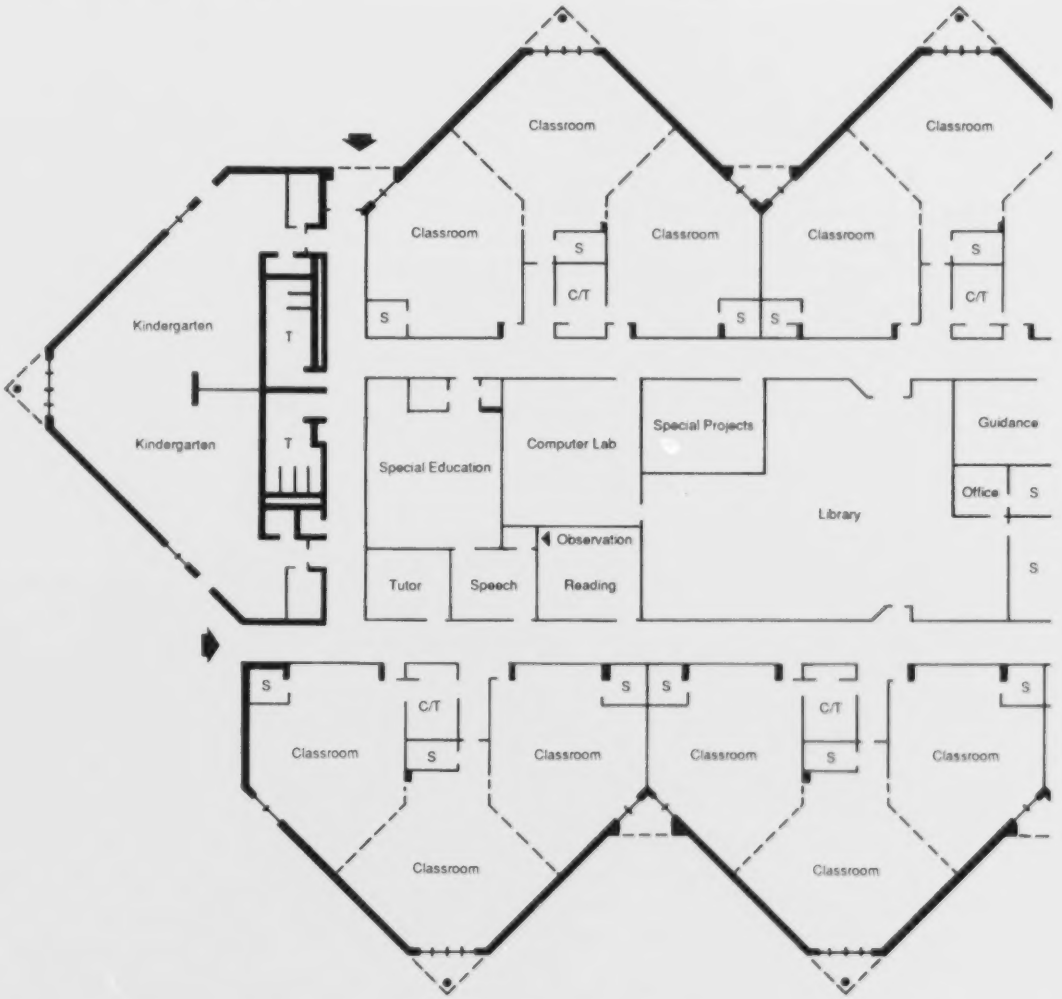
- Will facilities be provided for food services? Will food be prepared in a central district kitchen or at local schools?
- Will space be designated exclusively for eating, rather than multipurpose use, to accommodate several mealtimes throughout the day?
- Will the facility accommodate the preparation and serving of various foods to meet ethnic preferences and other needs?
- Will a clinic for treating minor illnesses and diagnosing students for referral be provided?
- How will physical fitness facilities be provided? Will there be both indoor and outdoor facilities?

Figure 3. Worthington Elementary School

Worthington, Ohio

A key feature of this design is that it can accommodate changes in technology and in educational philosophy for the life of the building. The movable walls allow flexibility in the configuration of classrooms. This design option encourages cross-age and peer tutoring, small- and large-group instruction, team teaching, and cooperative learning. Conference and tutoring rooms can be used by teachers, adult volunteers, and resource teachers to work with students. Media services, administrative offices, and other support service facilities form the central core of the building and serve surrounding classrooms.

SEM Partners, Architects



Classroom
Classroom
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C/T
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Office
Receiving
Lockers
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Food
Kitchen
Boiler
S
Electrical
PE Storage
T
T
Psych Office
Conf.
Staff Workroom
Telephone
S
Exam
Nurse
Isolation
T
Conference
Staff
Principal
Office
Courtyard
Cafeteria
Platform
Multi-Purpose Room
Office
Lobby
S
C/T
S
Classroom
Classroom
S
Classroom
S
Darkroom
Kiln
Vocal Music
Art
Small Group Instruction
Instrumental Music
Legend
S = Storage
C/T = Conference/Tutor
T = Toilet

Preschool and Before- and After-School Care

"Bayview's early primary center is for children from four through six years of age. The school's primary center serves children from seven through nine years of age, and its intermediate center is for children ages ten through twelve years. . . . The school's day-care programs [are] held before and after school and during vacations."

The need for more, better quality, low-cost child care has been well documented. Many families cannot afford high-quality child care; the number of families in which both parents work is increasing; and research has documented the benefits of good child-care programs. A developmentally appropriate educational program for preschool youngsters has helped these youngsters do better in school; later on, it also significantly deters students from dropping out of school and cuts down on juvenile delinquency and unemployment.

Good before- and after-school programs provide appropriate activities in a safe environment for children. The school can provide interesting and challenging activities that stimulate children's mental and social growth. These programs are important for safety reasons, and they help to prevent students' juvenile delinquency and involvement with drugs and alcohol. Schools can incorporate preschool programs and before- and after-school programs at the school. Middle schools may also want to consider extended-day programs to keep students meaningfully occupied after school.

Extended day-care facilities may operate from early morning until late at night; in some cases, they may operate 24 hours to accommodate the work shifts of parents.

- How will preschoolers be housed? Will separate buildings be built, existing buildings retrofitted, or portable buildings added?
- Where will the before- and after-school programs be housed? Will they share any facilities with the preschool area?
- Will the facilities need to include provisions for eating, sleeping, and learning?
- What types of lighting will be provided for nighttime activities?
- Will facilities have toilet areas which can be supervised, plus controlled shower facilities and space for sick children?
- Will a food preparation area be organized so that both adults and children may use it safely?
- Will facilities and furniture be scaled to small children, with appropriate colors, textures, sizes, and shapes?
- Will space be available for conferences with parents, meetings, and interaction with community groups?
- Will the location be convenient and safe for parents and students to enter and exit?
- Will space outside the facilities provide environmental challenges or foster water play, sports, and gardening experiences?

Community Use of the Facilities

"Bayview's original administrative office has been converted into rooms that are used by other community agencies."

Traditionally, schools have been used only by students, teaching staff, and parents for school-related functions. Future schools will more likely be designed for use by a variety of groups. For example, senior citizens could be included in meal programs at the school; community groups could use conference rooms and the library/media center; a child-care program could be operated at the school; and adult education classes could be conducted in the evenings.

As neighborhoods mature and their populations of school-age children decrease, school buildings can be used for other community functions. The Civic Center Act (*Education Code* Section 40040 et seq.) provides for a civic center at every school for public, literary, scientific, recreational, educational, or public agency meetings; and the Act sets forth the conditions of community use. Many schools are already heavily used by community groups, and this use will undoubtedly continue and even increase.

Design Implications

If many groups use the school, it needs to be designed to be open during the day, evening, weekend, school vacations, and summers.

- Will the design and materials used allow maintenance and refurbishment with a minimum of down-time?
- What types of lighting will be provided to accommodate nighttime activities?
- Will adequate storage be provided when facilities are used by two or more shifts of people?
- Will facilities easily accommodate the elderly and individuals with exceptional needs?
- Will a separate food preparation and service area be provided for small gatherings so that the main areas can be secured?
- Will play areas be provided that incorporate games suitable for young and old alike?
- Will a community library space be established that can be used by the public during school hours as well as after school hours?
- If the community uses the school's facilities during school hours, will parking and access minimize disruption of the regular school program and eliminate unsafe traffic patterns?

School Size

"Bayview . . . can accommodate about 720 students, and approximately 600 attend at any one time."

The issue of a school's size has been the subject of much research; there are no clear-cut resolutions. Two of the most commonly agreed on conclusions are that:

- The optimal school size is one that supports the kind of education the community wants at a cost it can afford.
- The central concern should be the relationship between teacher and student. The school's structure, no matter what its size, must support that relationship.

Other factors to be taken into consideration are the district's geographical characteristics, its tradition and history, the density and location of its student population, and local politics. In other words, size, per se, is not the only, nor the most crucial, factor determining a school's success.

Large school districts, especially urban districts, tend to have larger schools than do smaller, rural districts. Therefore, what is large to one district may be small or medium-sized to another. The following table shows how most researchers, for purposes of analysis, categorize a school's size:

Number of students, by size description

Grade level	*Very small*	*Small*	*Medium*	*Large*	*Very large*
K–5 or K–6	1–100	101–300	301–600	601–1000	1000+
6–8 or 7–8	1–300	301–700	701–1200	1201–1500	1500+
9–12	1–600	601–900	901–1500	1501–2400	2400+

A school should be large enough to include an area equivalent to a well-identified community of people who have a certain amount of interaction and certain interests in common. Some union high school districts which embrace more than one community have found it desirable, therefore, to build more schools, each serving a different community of people within the district. If the needs of a community have not been adequately provided for, it might withdraw from the district to establish its own high school. If a single high school can meet the needs of several communities, the communities have chosen to retain one larger school.

Through experience, many educators conclude that the large school has certain disadvantages. One of these is its impersonal character, which makes it difficult for students and staff to know one another well enough to create a sense of belonging. The primary strategy for minimizing this disadvantage of a large school is to break the school into various "houses" or "schools-within-a-school."

Large schools tend to make it difficult for many pupils to participate in student government, sports, and other activities. In smaller schools more students may participate in activities, and close relationships between students and staff can be more easily achieved.

A close relationship between the school and the home improves the school's efficiency. Very large schools impede close understanding and cooperation between school and home; they also often involve several communities whose characters and educational needs differ.

Furthermore, coordinating an instructional program is more difficult in a very large high school. Instructional departments tend to become more and more self-contained, and the desirable integration among specialized courses occurs less frequently. Both large schools and very small schools may cost more per student to operate.

Research on the relationship between academic achievement and school size is inconclusive. Some studies have found no relationship; others have found that larger schools—within reasonable size limits—produce better results.

Additional factors to be considered are students' circulation patterns and congestion in areas such as libraries, cafeterias, and hallways. These problems are more difficult to overcome in very large schools, even with staggered schedules.

The California Department of Education suggests that 600 students is optimal for elementary schools; 1,000 students, for middle or junior high schools; and 1,800 students, for high schools.

Design Implications

Educational policymakers need to focus on how to organize a school, once its size is determined.

- What criteria will be used to determine a school's size and its maximum student density per acre?
- If a very small school is planned, will several buildings be placed around a central courtyard, or will one larger building house all school functions?
- If a very large school is planned, will it consist of smaller units which create a sense of community and belonging, or will it be constructed as a single unit?
- Whatever the school's size, will it have a master plan for a maximum enrollment?
- Does the plan provide for the expandability of core facilities and specialized spaces as well as the addition of standard classrooms to accommodate a higher enrollment of students?

Parental Involvement

"Quentin's mother, who is a physical education instructor at a nearby school, participated on the planning committee."

While schools have always communicated with parents, they usually have not relied on parents as a resource in educating the child. Ideally, in the future, parents will take much more responsibility for their children's education. Recent research has shown that when parents are involved in their children's education, the children do better in school and the schools improve. More training may be offered to parents in instructional and support roles, many more parents may volunteer at the school, more communication will take place between teachers and parents, and more parents will be involved in decision making.

Design Implications

Strong parental involvement will affect school design.

- Will there be offices or rooms for parents to meet with teachers?
- Will space be provided for parents to work on projects, special activities, or schoolwide councils?
- Will parking be adequate?
- Will enough phone lines be provided so that parents can contact the school easily?
- Will telephones, word processors, and translators be available so that teachers can communicate with parents?
- Will computers or other means of communication connect the school to the home, when possible, enabling parents and students to have access to information regarding homework assignments, attendance records, and progress reports?

Appropriate Use of Technology in Curriculum and Assessment

"They learn a lot in college, but learning doesn't stop when you leave school."

Technology should be used appropriately to enhance the curriculum and improve learning. It is also important to use technology for assessment; for example, videotapes and audio recordings can be made of students' work.

Technology should assist teachers in planning ways to help their students to learn more easily. For example, all students may have computers on their desks or at their workstations for writing, editing, computing, and doing research. Electronic and visual media may be used rather than textbooks to teach history, science, and other subjects. As more interactive teleconferencing becomes available, schools will be able to bring a famous scientist, mathematician, musician, or artist to many classrooms simultaneously. In this way, students can see what they are learning applied in the real world, and they can talk to the experts.

Using appropriate technology necessitates changes in how teachers teach and how students learn. Instead of being dispensers of knowledge, teachers will become facilitators or consultants. Teachers will benefit from technology by increasing their knowledge of a subject as they learn with their students. Perhaps the greatest advantage of technology is its potential for customizing teaching methods to fit the individual needs of students and allow them to study at their own pace.

Design Implications

Depending on the needs of students, access to technology will vary widely—from a few computers in selected areas, to computers on every desk, to completely equipped multimedia rooms.

- If only a few computers are provided in selected areas, on what criteria will this placement be made?
- If computers are provided in every classroom, how will they be arranged; i.e., around the periphery, in clusters, in rows, facing the same direction, or on top of the desks?
- If a multimedia center is provided, what equipment will it include, and how will its use be scheduled?

Students may use affordable, notebook-sized computers to take notes and tests. Having digital drawing pads at their desks can allow them to share visual explanations of their thinking and questions. An expanded computer or typewriter keyboard may be used by individuals with exceptional needs.

- How will this technology affect the need to design space for separate desktop computers, power sources, and interactive network capabilities?

Fiber-optic cable can be used for the simultaneous transmission of audio and video data to bring the school into the home and the home into the school. For example, national and international data networks will allow American students studying China to correspond electronically with students in that country.

- How will this interactive network be incorporated into the school's design?

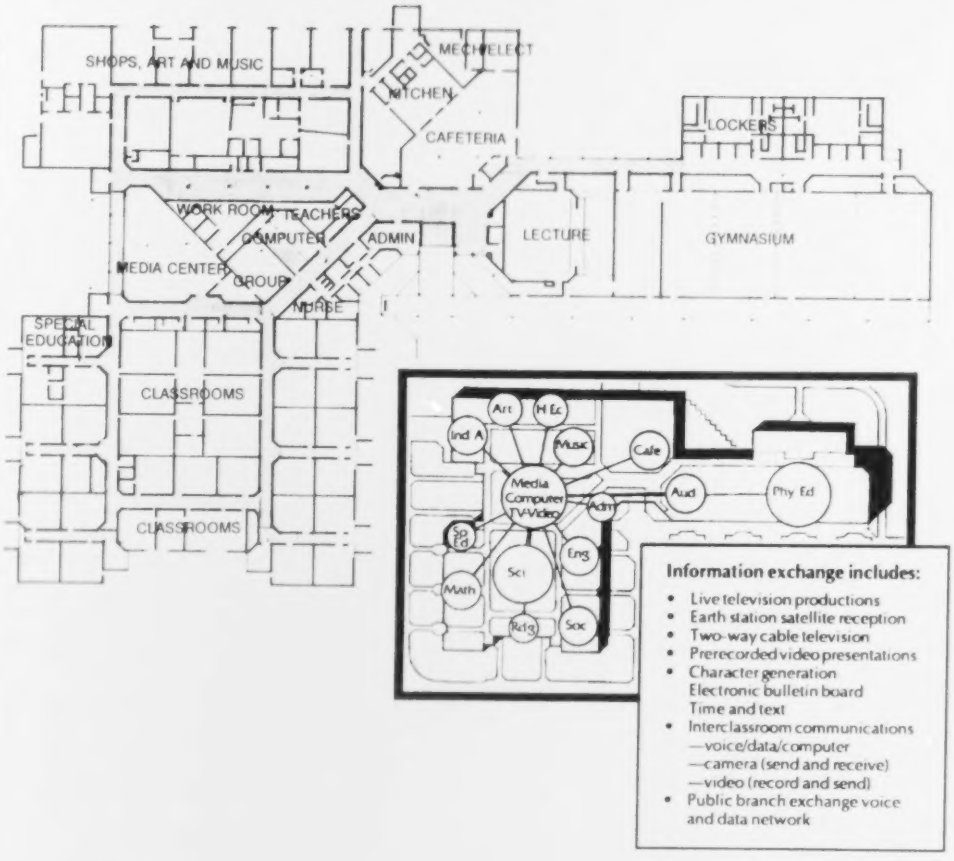
Figure 4. Faribault Junior High School

Faribault, Minnesota

Faribault's fully integrated communications system makes use of state-of-the-art technology for a variety of educational purposes, such as satellite broadcasts, instructional videotapes, and data sharing among campuses and the district office.

The detail schematically illustrates Faribault's integrated communications system, showing the network that links all areas of the campus to its media/computer center. This network allows the exchange and dissemination of a wide range of information.

Armstrong Torseth Skold and Rydeen, Architects



Optical disk simulation labs can allow the vicarious execution of potentially dangerous or otherwise unfeasible lab experiments.

- Will this simulation facility be incorporated into the regular science classroom, or will it be a separate laboratory?
- Will this simulation capability be available at each student's desk or projected on a large screen from the teacher's demonstration desk?

The classroom should be able to accommodate large, thin, liquid crystal display (LCD) panels for the display of text, graphics, and videos to enhance a lecture by creating a visual representation of the topic. Laser holographics will allow three-dimensional reconstruction of historical sites, works of art, or architectural designs.

- Will the LCD-type panel be built-in or movable?
- How will free space be provided for the three-dimensional display?

There may be a central communications center.

- Will there be capabilities for an electronic braillewriter, facsimile production, reference searches, a two-way radio, telephones, a speech synthesizer, and videos?
- Will a teleconferencing facility allow students and teachers to interact with others at one or more distant locations?

An interactive network could connect all the computers in the room, allowing the teacher to call up various instructional programs and relay them to individual computers.

- How will classroom furniture and equipment be designed and arranged, and how will power be provided?
- Will the program appearing on the students' computers be simultaneously projected on to a large screen?
- How will the teacher's control center be designed?

Other equipment to be provided for in the classroom includes a video projector, a retractable motorized screen, variable intensity lighting, a color video camera, a videocassette recorder, automatic translators, an interactive laser disk retrieval system, and a microwave dish for cable and satellite television, all controlled by the teacher from a master control center.

- How will the classroom be designed to use and store this equipment? Will all classrooms be so equipped or only certain ones?

An Example: Using Industrial Technology and Educational Programs in Career–Vocational Education

Technology has had a dramatic impact on the work force: It has changed the way in which jobs are performed, has eliminated many unskilled and entry-level jobs, and has displaced large numbers of workers. As a result, specialized spaces and equipment are particularly needed in career–vocational education. In fact, this curricular area has been one of the first to respond to rapidly changing technology by designing and altering space to accommodate new educational programs.

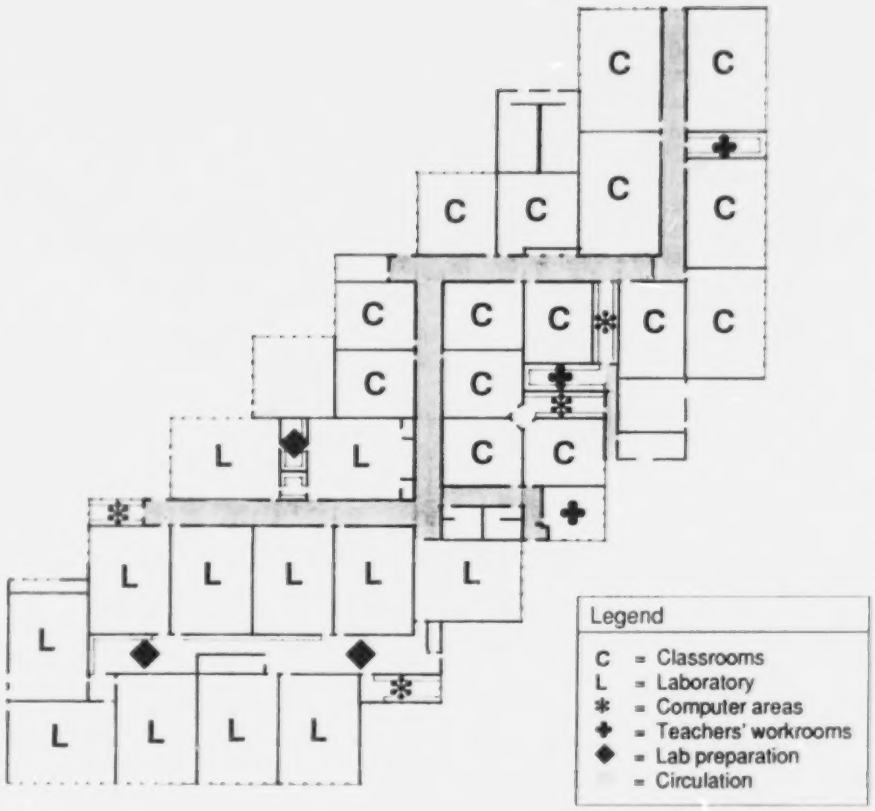
Through the 1990s and into the twenty-first century, technology will continue to change work patterns and needed skills. Manufacturing will still account for about 40 percent of the nation's production. However, because of robotics, automation, and other capital-intensive technology, the number of new jobs in manufacturing is expected to increase by only 5 percent. The number of service jobs, on the other hand, many of which require communications and information-processing skills, is expected to increase by as much as 40 percent. The twenty-first century will see a proliferation of new occupations of increasing complexity, and career–vocational education must change its programs and its methods of instruction; the school facility must change accordingly.

Figure 5. Century High School

Santa Ana, California

In this design, computer facilities and adjacent classrooms and laboratories are integrated. The inclusion of laboratory preparation areas is an example of an effective arrangement of service spaces and instructional spaces.

Ralph Allen and Partners, Architects



The traditional methodologies for teaching courses in manufacturing, construction, transportation, and communications called for a corresponding classification of information. A school might have had a wood shop, a metal shop, an auto shop, and a print shop. Unfortunately, most elements of new technology do not fit into these categories. For example, should laser technology be taught in only one shop, by only one teacher, or in all shop classes? A more cost-effective interdisciplinary alternative allows the technology teacher to incorporate a laser technology module, for example, as well as other modules of different subjects, into the total curriculum in that classroom. Instead of one shop offering a single subject, a technology laboratory will have numerous alcoves, where several modules are offered, such as:

- Computer-assisted publishing and word processing
- Computer-aided manufacturing
- Robotics and holography
- Pneumatic structures/strength of materials
- Hydroponics (cultivation of plants in water containing dissolved inorganic nutrients)
- Aerodynamic testing
- Ergonomics (study of work done by muscles)
- Space frame construction
- Electronics
- Applied physics
- Drafting, computer-assisted design
- Small engines
- Audio communications
- Light, lasers, and fiber optics

How will the facility be designed to accommodate this kind of exploratory vocational education program?

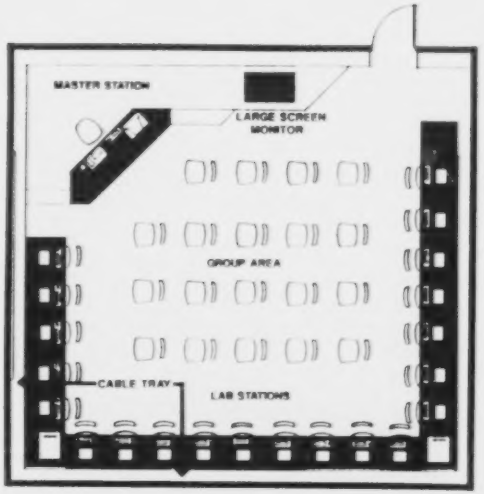


Figure 6. Jedediah Smith Elementary School Demonstration Classroom

Sacramento, California

This demonstration classroom is equipped with computer technology that is designed to enhance instruction. The computers at the perimeter of the room are linked to the master station, which allows the teacher to monitor individual workstations and to project work on to a large screen. The master station is also equipped with a video camera, a VCR, and a laser disk.

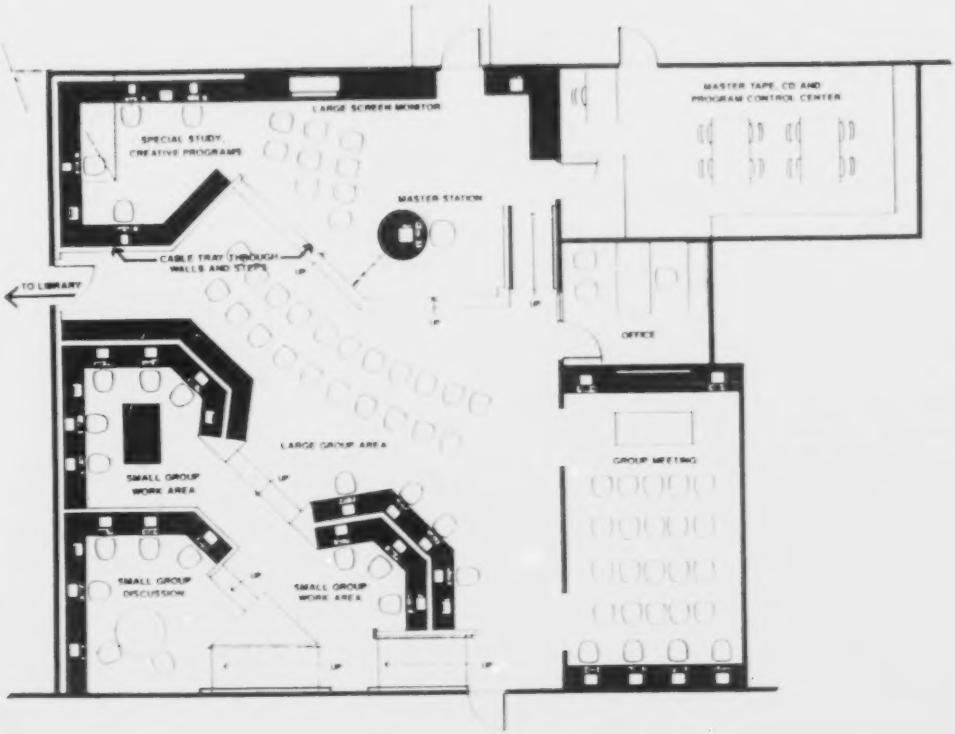
Herbert E. Goodpastor, Architect

Figure 7. Charles M. Goethe Middle School Information Center

Sacramento, California

This school's information center, which is linked to computers campuswide, is specially designed for students. Controlled from the master station, small work areas allow students to carry on different activities concurrently. The information center is adjacent to the school's traditional library and supplements its programs.

Herbert E. Goodpastor, and Rickey and Brooks, Architects



Year-round Education

"Bayview, which has recently been remodeled, is a four-track, year-round school."

Year-round schools have been operating for a number of years and have been successful both educationally and economically. As student populations continue to grow and financial resources for new school construction become more limited, economic necessity will increase the impetus for year-round scheduling.

Year-round scheduling typically can increase a school's student capacity by about 20 percent, thereby reducing the need for new construction and saving millions of dollars annually. Although year-round education provides opportunities for continuous learning, increased educational offerings during intersessions, more flexibility in scheduling family vacations, and less strain on community resources during the summer, the primary reasons that most school districts will seriously consider year-round schools will be political and economic.

The implementation of a year-round educational program has a significant impact on the use of space in an existing school and on the design of a new school. Immediate issues concerning space require careful planning when an existing school is being converted to a multitrack school. Designing a new school provides the opportunity to plan the optimal environment for a successful, efficient, year-round educational program.

Future use must also be addressed in the design of a year-round school. While space allocation initially focuses on the multitrack operation, it is feasible that when overcrowding ceases to exist, the facility may return to a year-round, single-track operation.

The design of year-round schools poses some unique considerations.

Climate Control

- Will shade trees and shade structures over outside seating areas be used at year-round schools? Will an inside eating area be necessary for a school located in a hot climate?
- Will air conditioning and insulation systems be designed to cool all interiors efficiently and economically throughout the summer?
- Will the orientations of buildings and the locations of windows be designed to lower the inside temperature?
- Will poor outdoor air quality during summer months require that physical education instruction be conducted inside, in a large multipurpose room?

Support Facilities

- Events such as holiday programs, all-staff meetings, and open house will require adequate space. Will multipurpose rooms, meeting rooms, auditoriums, staff rooms, and conference rooms be needed to accommodate the entire population of students, staff, or parents at one time?
- One of the major considerations in the design of year-round schools is the need for increased storage and work areas for teachers. A possible solution to this problem is the creation of a teachers' preparation room, which provides adequate space for teachers—a permanent place for their personal libraries, for preparation, for remedial learning opportunities, and for parent-teacher consultations. This room is adjacent to classroom spaces. Another solution for existing schools that are

converting to year-round education is the use of a specially designed relocatable unit, such as the one illustrated in Figure 8.

- Will the teachers' preparation room or space serving similar functions be included in the design and construction of future schools?
- How will additional administrators and support staff at year-round schools be accommodated? Will more space for storing records be added in the administrative office?

Intersession

- Will space be provided to conduct intersession programs for off-track students? Will spaces be clearly marked so that students returning from off-track sessions are able to identify their new rooms easily?

Maintenance

- How will the facilities be designed to allow maintenance and refurbishment with minimal downtime? Will higher quality construction materials be used to reduce maintenance costs? How will refurbishment schedules be developed to address the wear and tear resulting from year-round schedules and longer daily use?

Parking

- Will additional parking be needed to accommodate larger staffs and crowds for special events or meetings?

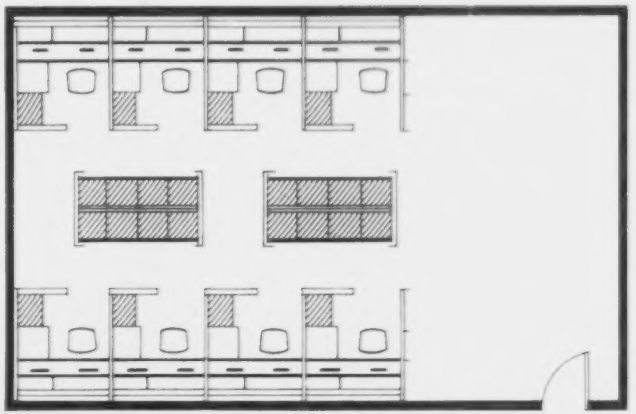


Figure 8. Relocatable Storage and Work Unit

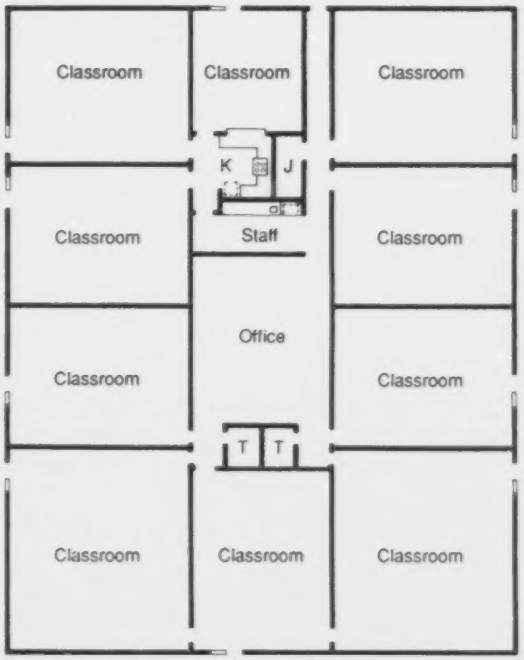
This drawing illustrates one solution to the problem faced by multitrack, year-round schools when off-track teachers must remove their personal and educational materials from classrooms. Typically, these materials are stored in an inaccessible area. The relocatable room depicted here is specially designed to function as a storage and work area for eight to 12 teachers. The storage cabinets are portable and can easily be wheeled from place to place as teachers move on- and off-track.

Figure 9. Golden West High School

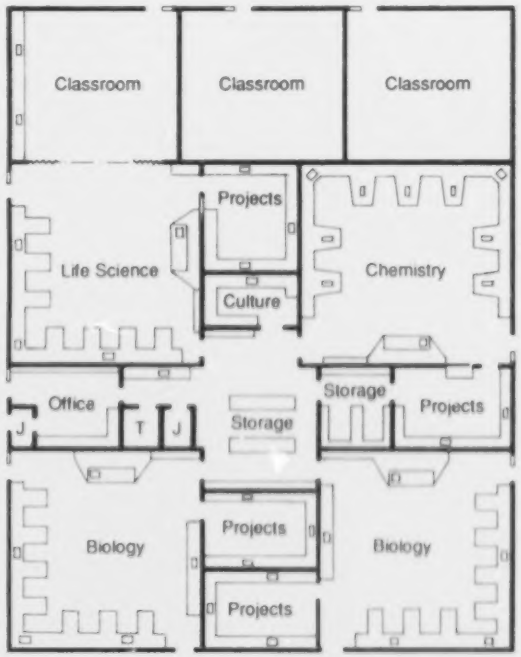
Visalia, California

These plans for a classroom unit (9a) and a science unit (9b) illustrate a flexible and economical use of space with long-term benefits. The classroom design has advantages for year-round schools in which teachers must vacate their rooms when they are off-track. The large office area can accommodate 12 desks and contains storage and work areas for off-track teachers. The design of the science unit incorporates features that can also accommodate year-round schedules, such as office and storage areas that can be used by off-track teachers. Small-group alcoves and classrooms connected to laboratories are additional examples of flexible space.

Octagon Associates, Architects



9a. Classroom building



9b. Science building

Legend
K = Kitchen
J = Janitorial closet
T = Toilet

Modular/Flexible Schools

"Many of the . . . buildings at the school are now relocatable and can be added or taken away as the number of students increases or decreases."

Schools that are built with a permanent core can add or delete modular buildings as the population grows or declines. They also can be transformed into different kinds of facilities depending on the need.

Design Implications

The need for flexibility can be met by using various design and construction concepts.

- Will the design include permanent core facilities, either "stick-built" or modular, and portable classrooms? When enrollment declines or the school is no longer needed, the portables can be removed, and the core facilities, with their demountable walls and partitions, can be converted to other uses.
- Will schools be totally portable and relocated as needed?
- Will schools be totally permanent and designed with some other potential future use in mind?

*For multimedia presentations

Figure 10. Krameria Elementary School
Perris, California

This design illustrates an approach to providing a full range of teaching space. The plan features movable walls between classrooms and includes the option of converting the classrooms at each end of the building to relocatable units, with little effect on function or esthetics. The plan also incorporates well-defined support spaces adjacent to classrooms, including a centrally located teachers' workroom with visual access to the classrooms and small-group instruction areas adjoining it.

Porter Jensen Hansen Manzagol, Architects

III. Developing and Implementing a Plan

To make a new school a reality, the school's staff, parents, students, and community should develop a comprehensive plan that meets their needs. The plan can be used as a starting point for gathering information about the school's community and to determine its present and future needs. A comprehensive facilities plan also allows the district to estimate the future enrollment, age, socioeconomic background, and ethnic composition of students. The plan should also address attendance boundaries, desegregation plans, and the size and location of the new school, as well as the quality of existing schools.

Further, a comprehensive plan allows the district to establish priorities for educational programs and facilities. The district can then develop a program of financing for the construction of new facilities. Properly coordinated, the district's facilities plan becomes an invaluable tool for the use of both the school and the community.

The Planning Steps

The process of designing schools for the twenty-first century—from gathering ideas to evaluating the finished product—can be broken down into the following steps:

- Establish a planning organization and specify roles and responsibilities.

- Collect and analyze data on enrollment, facilities, the community's expectations, and the educational programs; identify trends, directions, and goals.
- Assess alternative ways of achieving the goals, and select the preferred methods.
- Develop a comprehensive plan.
- Implement the plan, provide the facilities, and put the facilities into use.
- Evaluate the completed facilities and update the master plan.

Once the governing board passes a resolution commiting the district to initiating the plan, specific individuals should be designated as leaders and held responsible for its implementation. A planning committee should be established that is composed of board members, officials of local government agencies, business leaders, the school district's staff, principals, teachers, students, and classified personnel. The district's size determines the committee's composition. Individuals' responsibilities should be specified, as well as the time and financial commitments needed to develop the plan.

The committee should recognize that planning programs and facilities is important to the whole educational process. One of the committee's primary roles is to develop a method for the continuous analysis and evaluation of the district's educational and cultural goals and objectives. Cultural considerations include, for instance, bilingual and adult education programs and nutrition and health efforts.

By involving the total staff and community in the plan's development and monitoring the changes in the community, the planning committee can anticipate local needs. Other resources can also be used in this process, including representatives of the California Department of Education, colleges and universities, county superintendents of schools, and architectural and technical consultants. An ongoing system of communication and evaluation will also allow the planning committee to provide leadership in problem-solving techniques. The committee's decisions should be made known throughout the district.

Determining Specifications

Critical to the district's facilities plan are its specifications, which trace the history of the school district's educational program and its community, goals, practices, and systems. These specifications, which guide the architect in matching the design for the school to the needs of its users, are based on the educational programs, people, and activities to be accommodated. One of the main benefits of developing such specifications is the process itself, which allows staff and others to look at what is being done and what should be done in the future. Through this process, goals are set, objectives are reviewed, and activities to carry out these objectives are identified.

Specifications for the proposed facility should be presented in a plan that includes the following components:

1. *Introduction:* Describes the philosophy and goal of facility planning and the way in which the school will fit into the community's long-range plan.
2. *People to be served:* Includes the demographic substantiation for the school and outlines the nature of the pupils, staff, and other community persons to be served.
3. *Educational program*: Identifies the curriculum as well as the activities, spaces, and space relationships necessary to imple-

ment the curriculum's goals and objectives properly. Methodological and organizational considerations are included.

4. *Instructional areas*: Delineates the activities, people, and equipment to be housed. Special requirements and the relationship among spaces are also indicated.
5. *Support areas:* Covers the same features outlined in "Instructional areas" plus administration, student services, staff rooms, food service, maintenance and operational considerations, and toilet facilities.
6. *Site areas:* Includes outdoor and physical education programs, community recreation programs, bus loading and other vehicle requirements, and components that are important to the school's safe and efficient operation. Activities and safety concerns, especially regarding traffic, directly influence the building's placement and orientation. Aesthetic appearances can be enhanced with attention to texture, color, and greenery. Inside the building, appropriate furniture and equipment can do much to support selected educational activities and provide an attractive environment.

Regional differences should also be considered, along with building techniques, materials, climate, geography, soil conditions, cultural matters, and financial support.

Planning for Quality

Investing time, energy, and dollars wisely in school planning will, over the life of the school, result in a facility that is cost-effective and efficient for many years. For example, careful planning for design and energy conservation can result in major financial and educational benefits.

Design Flexibility. While a school building will exist for decades, technology and our student population are changing dramatically. To reduce future renovation and remodeling costs and to accommodate changes in technology and educational programs, schools must be designed so that alterations can be made as quickly and inexpensively as possible. Schools need flexible spaces where students can choose from and participate in a wide range of activities and use an assortment of information sources. These options require several kinds of habitats, such as learning centers, lofts, project spaces, and common gathering spaces.

Just as modern office buildings, whose tenants may change frequently, must be adaptable to tenants' needs, schools too must be adaptable. Thus, designs for schools should be flexible in the placement of partitions, doors, and mechanical and electrical systems. Unlike the "open space" designs of the past, plans for new schools should feature long-span steel or concrete structural systems with easily moveable walls and partitions with low sound transmission that can be installed to accommodate changing learning environments. Such structurally unencumbered open spaces will accommodate a variety of learning habitats that are scaled to different users and adaptable to changing programs and technology. In addition, flexible mechanical, air conditioning, and electrical systems, which allow wires to be run above drop ceilings or within electric grids below the floor, will permit the efficient addition of electronic chalkboards, laser disk technology, interactive and integrated video equipment, satellite dishes, and large screen displays.

Energy Conservation and Efficiency. Energy conservation measures will continue to be an important consideration of a school's design. Little cost is involved in carefully planning a

building's orientation, shape, landscaping, and color. Attention to these design elements can reduce energy costs.

For example, a building's orientation on a site significantly affects energy consumption. A rectangular building absorbs less solar heat and needs less energy for air conditioning if its length is aligned on an east-west axis. The smaller walls will then face east and west, where the sun is more intense than it is on the north or south walls. Another plan to consider is building the school into a slope, if possible, or using earth berms to reduce heat loss through walls during the cold weather and to provide added cooling during hot weather.

A building's shape and layout should also be considered in determining energy requirements and relative economy. Since heat is gained and lost through the walls and roof, minimizing these surface areas will reduce energy consumption. Given equal square footage, a round building has less surface area, relative to interior space, than does any other building shape; a square building has less surface area than a rectangular one. An additional factor to consider is that a compact building may be more economical because it requires less air conditioning and shorter plumbing and electrical systems. On the other hand, the natural ventilation and lighting potential of a building with a more open, "sprawling" design may offset its additional land and construction costs.

Careful planning of landscaping can also help reduce energy costs. For example, deciduous trees can be planted near south walls. The trees provide a cooling shade in the summer, and in the winter, when they drop their leaves, they allow sunshine to warm the building.

The selection of colors for roofs, walls, and ceilings is also important. The darker the roof, the more heat the building absorbs and the more the roof expands, causing the roofing material to deteriorate faster than lighter colored roofing. Inside buildings, light-colored walls can increase illumination. Natural daylight can be used to reduce energy costs through carefully planned skylights and clerestories.

Other elements that can play an important role in energy conservation and efficiency and cut costs are passive and active energy systems, such as heat pumps, solar panels, insulation, masonry walls (where practical), window coverings, and efficient mechanical systems. Many energy-efficient mechanical and electrical systems are available today. For instance, controlled lighting reduces energy requirements with automatic adjustments from optic-fiber sensors or photo cells which automatically adjust the lighting and room temperature.

When evaluating the costs of energy systems, school facilities planners can make a *life cycle costing analysis,* which takes into account comparative costs over a period of time, including purchase, installation, and maintenance costs. While initial costs for energy-efficient designs may be higher than those for traditional systems, the life cycle costing analysis will reveal whether money can be saved in the long run. Once the time period or life cycle of a product is established, a return on investment can be calculated to determine whether the higher purchase price is justified. Such an approach can enable school planners to decide whether spending a little more initially for high-quality materials and products will result in a savings over the life of the equipment and facilities.

The following checklist can be used to develop and implement a comprehensive facilities plan.

Master Plan Checklist

Yes

I. Plan development

1. Is there a commitment by governing board resolution? ___
2. Is the planning committee broadly represented? ___
3. Are outside professional resources being used? ___

II. Education

A. History

1. Is there a narrative describing the background, composition, and other characteristics of the district? ___
2. Is there a historical description of the district's growth pattern? ___
3. Is there evidence of past educational philosophy and needs? ___
4. If there is evidence that a new educational philosophy or need is emerging, is that philosophy or need addressed? ___

B. Community of the school district

1. Is the social, economic, and ethnic composition of the community identified and described? ___
2. Are sociological issues addressed? ___
3. Is there a policy for coordinating with other public agencies? ___
4. Is there a policy for community involvement? ___

C. Educational goals and policies

1. Are the educational goals of the district stated? ___

D. Educational system

1. Are grade level programs described? ___
2. Are there criteria for the design of the site? ___
3. Are class size and staffing patterns described? ___
4. Are instructional support programs described? ___
5. Are the pupil services programs described? ___
6. Are general support services described? ___
7. Are other special programs described? ___

III. Educational facilities

1. Have the existing facilities been evaluated? ___
2. Is the capacity of each school indicated? ___
3. Does each facility have a site utilization and plot plan? ___

IV. Demographic study

A. Mapping

1. Has a base map been completed? ___
2. Is a zoning map included? ___
3. Is there a census map? ___

B. Collection of statistics

1. Is a current census base included? ___
2. Is enrollment projected? ___
3. Does each pupil have a data file? ___

V. Implementation plan

1. Is there a master maturation plan for all existing and future schools? ___
2. Are there plans and policies for complying with the California Environmental Quality Act? ___
3. Is there an evaluation process for the plan's implementation? ___
4. Is there a built-in feedback system for reporting to the superintendent and the governing board? ___

IV. Resources

THE California Department of Education's School Facilities Planning Division provides assistance in planning school facilities. The division's telephone number is 916-322-2470. The following departmental publications may also be helpful as you design your educational programs and determine your facilities' needs. Most may be obtained by contacting the California Department of Education, Bureau of Publications, Sales Unit, P.O. Box 271, Sacramento, CA 95802-0271, (916) 445-1260. Those marked with an asterisk (*) may be obtained directly from the School Facilities Planning Division, P.O. Box 944272, Sacramento, CA 94244-2720.

Administration, statistics, school finance

Microcomputer Software Use in School District Business Offices: Report of a Survey (1989)

Child development

Here They Come: Ready or Not—Report of the School Readiness Task Force (1988)

Curriculum materials, including frameworks

Caught in the Middle: Educational Reform for Young Adolescents in California Public Schools (1987)

English–Language Arts Framework for California Public Schools (1987)

Foreign Language Framework for California Public Schools (1989)
Handbook for Physical Education: A Framework for Developing a Curriculum for California Public Schools (1986)
Health Instruction Framework for California Public Schools (1978)
History–Social Science Framework for California Public Schools (1988)
Mathematics Framework for California Public Schools (1985)
Science Framework for California Public Schools (1990)
Visual and Performing Arts Framework for California Public Schools (1989)

Facilities

Administration of Maintenance and Operations in California School Districts (1986)
California School Energy Concepts (1978)
California School Lighting Design and Evaluation (1978)
**Facilities Performance Profile: An Instrument to Evaluate School Facilities* (1978)
Forty Years of School Planning (1969)
Guide for the Development of a Long-Range Facilities Plan (1986)
**School Site Analysis and Development* (1987)
**School Site Selection and Approval Guide* (1989)
**School Sound Level Study* (1986)
To Plan a School (1971)

General interest

Becoming a Nation of Readers: The Report of the Commission on Reading (1985)
Opening Doors: California Educational Reform—Annual Report, 1989 (1990)
A Parent's Handbook on California Education (1986)
Year-round Education: Year-round Opportunities: A Study of Year-round Education in California (1987)

Nutrition, food services, and surplus properties

**School Food Service Facility Planning Guide, 1990* (Available from the Child Nutrition Division)
A Self-Assessment Guide for School District Fiscal Policy Teams: Standards of Excellence for School Nutrition Programs (1989)

School improvement

Quality Criteria for Elementary Schools: Planning, Implementing, Self-Study, and Program Quality Review (1990)
Quality Criteria for High Schools: Planning, Implementing, Self-Study, and Program Quality Review (1990)
Quality Criteria for Middle Grades: Planning, Implementing, Self-Study, and Program Quality Review (1990)

Testing, evaluation, and proficiency assessment

A Question of Thinking: A First Look at Students' Performance on Open-ended Questions in Mathematics (1989)
Writing Achievement of California Eighth Graders: A First Look (1989)

Vocational education

California Plan for Career-Vocational Education, 1988-89/1989-90, Two-Year Federal Supplement (1988)

Publications Available from the Department of Education

This publication is one of nearly 700 that are available from the California Department of Education. Some of the more recent publications or those most widely used are the following:

ISBN	Title (Date of publication)	Price
0-8011-0722-9	Accounting Procedures for Student Organizations (1988)	$3.75
0-8011-0272-3	Administration of Maintenance and Operations in California School Districts (1986)	6.75
0-8011-0838-1	Adoption Recommendations of the Curriculum Development and Supplemental Materials Commission to the State Board of Education, 1989: California Basic Instructional Materials in Bilingual Language Arts and Visual and Performing Arts—Visual Arts and Music (1989)	3.50
0-8011-0883-7	The Ages of Infancy: Caring for Young, Mobile, and Older Infants (videocassette and guide) (1990)*	65.00
	Becoming a Nation of Readers: The Report of the Commission on Reading (1985)	4.50
0-8011-0890-x	Bilingual Education Handbook: A Handbook for Designing Instruction for LEP Students (1990)	4.25
0-8011-0273-1	California Adult Education Handbook (1986)	4.00
0-8011-0687-7	The California CBO: The 1987-88 Profile of Chief Business Officials in California Schools, K–12 (1989)	4.50
0-8011-0862-4	California Education Summit: Background and Final Report (a set) (1990)	5.00
0-8011-0780-6	California Plan for Career-Vocational Education, 1988-89/1989-90, Two-Year Federal Supplement (1988)	5.50
0-8011-0889-6	California Private School Directory (1990)	14.00
0-8011-0853-5	California Public School Directory (1990)	14.00
0-8011-0748-2	California School Accounting Manual (1988)	8.00
0-8011-0092-5	California School Energy Concepts (1978)	2.25
0-8011-0093-3	California School Lighting Design and Evaluation (1978)	2.25
	California's Daily Food Guide (brochure) (1990)†	6.00/25
0-8011-0071-2	Caught in the Middle: Educational Reform for Young Adolescents in California Public Schools (1987)	2.75
0-8011-0874-8	The Changing History–Social Science Curriculum: A Booklet for Parents (1990)‡	5.00/10
0-8011-0867-5	The Changing Language Arts Curriculum: A Booklet for Parents (1990)‡	$5.00/10
0-8011-0777-6	The Changing Mathematics Curriculum: A Booklet for Parents (1989)‡	5.00/10
0-8011-0806-3	Characteristics of Professional Staff in California Public Schools: A Five-Year Comparison (1990)	NC
0-8011-0823-3	Coordinated Compliance Monitoring Review Manual, 1989-90 Edition (1990)	6.75
0-8011-0797-0	Desktop Publishing Guidelines (1989)	4.00
0-8011-0833-0	Directory of Microcomputer Software for School Business Administration (1990)	7.50
0-8011-0856-x	English as a Second Language Handbook for Adult Education Instructors (1990)	4.50
0-8011-0041-0	English–Language Arts Framework for California Public Schools (1987)	3.00
0-8011-0900-0	Enrollment and Staff in California's Private Elementary Schools and High Schools, 1988-89 (1989)	NC
0-8011-0901-4	Enrollment Data, California Elementary and Secondary Public Schools, 1988-89 (1989)	NC
0-8011-0751-2	First Moves: Welcoming a Child to a New Caregiving Setting (videocassette and guide) (1988)*	65.00
0-8011-0839-x	Flexible, Fearful, or Feisty: The Different Temperaments of Infants and Toddlers (videocassette and guide) (1990)*	65.00
0-8011-0849-7	Food Sanitation and Safety Self-Assessment Instrument for Child Care Centers (1990)	3.75
0-8011-0850-0	Food Sanitation and Safety Self-Assessment Instrument for Family Day Care Homes (1990)	3.75
0-8011-0851-9	Food Sanitation and Safety Self-Assessment Instrument for School Nutrition Programs (1990)	3.75
0-8011-0804-7	Foreign Language Framework for California Public Schools (1989)	5.50
0-8011-0012-7	Forty Years of School Planning (1969)	2.25
0-8011-0809-8	Getting In Tune: Creating Nurturing Relationships with Infants and Toddlers (videocassette and guide) (1990)*	65.00
0-8011-0288-x	Guide for the Development of a Long-Range Facilities Plan (1986)	2.50

*Videocassette also available in Chinese (Cantonese) and Spanish at the same price.
†The price for 100 brochures is $16.50; the price for 1,000 brochures is $145.
‡The price for 100 booklets is $30; the price for 1,000 booklets is $230.

ISBN	Title (Date of publication)	Price
0-8011-0875-6	Handbook for Contracting with Nonpublic Schools for Exceptional Individuals (1990)	$8.00
0-8011-0289-8	Handbook for Physical Education: A Framework for Developing a Curriculum for California Public Schools (1986)	4.50
0-8011-0824-1	Handbook for Teaching Cantonese-Speaking Students (1989)§	4.50
0-8011-0250-2	Handbook on California Education for Language Minority Parents—Chinese/English Edition (1986)‖	3.25
0-8011-0338-x	Health Instruction Framework for California Public Schools (1978)	2.25
0-8011-0734-2	Here They Come: Ready or Not—Report of the School Readiness Task Force (Full Report) (1988)	4.25
0-8011-0712-1	History–Social Science Framework for California Public Schools (1988)	6.00
0-8011-0782-2	Images: A Workbook for Enhancing Self-esteem and Promoting Career Preparation, Especially for Black Girls (1988)	6.00
0-8011-0750-4	Infant/Toddler Caregiving: An Annotated Guide to Media Training Materials (1989)	8.75
0-8011-0878-0	Infant/Toddler Caregiving: A Guide to Creating Partnerships with Parents (1990)	8.25
0-8011-0880-2	Infant/Toddler Caregiving: A Guide to Language Development and Communication (1990)	8.25
0-8011-0877-2	Infant/Toddler Caregiving: A Guide to Routines (1990)	8.25
0-8011-0879-9	Infant/Toddler Caregiving: A Guide to Setting Up Environments (1990)	8.25
0-8011-0876-4	Infant/Toddler Caregiving: A Guide to Social–Emotional Growth and Socialization (1990)	8.25
0-8011-0828-4	Instructor's Behind-the-Wheel Guide for California's Bus Driver's Training Course (1989)	20.00
0-8011-0869-1	It's Not Just Routine: Feeding, Diapering, and Napping Infants and Toddlers (videocassette and guide) (1990)*	65.00
0-8011-0358-4	Mathematics Framework for California Public Schools (1985)	3.00
0-8011-0794-6	Microcomputer Software Use in School District Business Offices: Report of a Survey (1989)	4.00
0-8011-0864-0	Model Curriculum Standards: Program Framework and Process Guide for Industrial and Technology Education in California (1990)	13.25
0-8011-0873-x	Opening Doors: California Educational Reform—Annual Report, 1989 (1990)	3.25
0-8011-0303-7	A Parent's Handbook on California Education (1986)	3.25
0-8011-0306-1	Physical Education for Individuals with Exceptional Needs (1986)	9.75
0-8011-0834-9	Program Cost Accounting Manual (Form J-380—Form J-580) (1989)	$20.00
0-8011-0886-1	Program Guidelines for Individuals Who Are Deaf-Blind (1990)	6.00
0-8011-0817-9	Program Guidelines for Language, Speech, and Hearing Specialists Providing Designated Instruction and Services (1989)	6.00
0-8011-0899-3	Quality Criteria for Elementary Schools: Planning, Implementing, Self-Study, and Program Quality Review (1990)	4.50
0-8011-0906-x	Quality Criteria for High Schools: Planning Implementing, Self-Study, and Program Quality Review (1990)	4.50
0-8011-0905-1	Quality Criteria for Middle Grades: Planning, Implementing, Self-Study, and Program Quality Review (1990)	4.50
0-8011-0815-2	A Question of Thinking: A First Look at Students' Performance on Open-ended Questions in Mathematics (1989)	6.00
0-8011-0858-6	Readings for Teachers of United States History and Government (1990)	3.25
0-8011-0831-4	Recommended Literature, Grades Nine Through Twelve (1990)	4.50
0-8011-0863-2	Recommended Readings in Literature, Kindergarten Through Grade Eight, Addendum (1990)	2.25
0-8011-0745-8	Recommended Readings in Literature, Kindergarten Through Grade Eight, Annotated Edition (1988)†	4.50
0-8011-0753-9	Respectfully Yours: Magda Gerber's Approach to Professional Infant/Toddler Care (videocassette and guide) (1988)*	65.00
0-8011-0868-3	School Crime in California for the 1988-89 School Year (1990)	3.50
0-8011-0870-5	Science Framework for California Public Schools (1990)	6.50
0-8011-0665-6	Science Model Curriculum Guide, K–8 (1988)	3.25
0-8011-0813-6	A Self-Assessment Guide for School District Fiscal Policy Teams: Standards of Excellence for School-Nutrition Programs (1989)	3.50
0-8011-0860-8	Self-Assessment Guide for School District Policy Teams: Maintenance and Operations (1990)	3.50
0-8011-0857-8	Self-Assessment Guide for School District Policy Teams: Pupil Transportation Services (1990)	3.50
0-8011-0813-6	Self-Assessment Guide for School District Policy Teams: School Nutrition Program (1989)	3.50
0-8011-0752-0	Space to Grow: Creating a Child Care Environment for Infants and Toddlers (videocassette and guide) (1988)*	65.00
0-8011-0807-1	Statement on Competencies in Languages Other Than English Expected of Entering Freshmen: Phase I—French, German, Spanish (1988)	4.00
0-8011-0855-1	Strengthening the Arts in California Schools: A Design for the Future (1990)	4.50
0-8011-0827-6	Technical Assistance Manual for the California Model School Accountability Report Card (1989)	3.75
0-8011-0019-4	To Plan a School (1971)	2.25
0-8011-0846-2	Toward a State of Esteem: The Final Report of the California Task Force to Promote Self-esteem and Personal and Social Responsibility (1990)	4.00

§Also available at the same price for students who speak Japanese, Pilipino, and Portuguese.

‖The following editions are also available at the same price: Armenian/English, Cambodian/English, Hmong/English, Japanese/English, Korean/English, Laotian/English, Pilipino/English, Spanish/English, and Vietnamese/English.

*Videocassette also available in Chinese (Cantonese) and Spanish at the same price.

†Includes complimentary copy of *Addendum* (ISBN 0-8011-0863-2).

ISBN	Title (Date of publication)	Price
0-8011-0854-3	Toward a State of Esteem, Appendixes to (1990)	$4.00
0-8011-0758-x	Visions for Infant/Toddler Care: Guidelines for Professional Caregiving (1989)	5.50
0-8011-0805-5	Visual and Performing Arts Framework for California Public Schools (1989)	6.00
0-8011-0814-4	Writing Achievement of California Eighth Graders: A First Look (1989)	5.00
0-8011-0832-2	Writing Achievement of California Eighth Graders: Year Two (1989)	$4.00
0-8011-0887-x	Writing Assessment Handbook, Grade 8 (1990)	8.50
0-8011-0686-9	Year-round Education: Year-round Opportunities: A Study of Year-round Education in California (1987)	5.00

Orders should be directed to:

California Department of Education
P.O. Box 271
Sacramento, CA 95802-0271

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Remittance or purchase order must accompany order. Purchase orders without checks are accepted only from governmental agencies. Sales tax should be added to all orders from California purchasers.

A complete list of publications available from the Department, including apprenticeship instructional materials, may be obtained by writing to the address listed above or by calling (916) 445-1260.

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